Target Hazard Identification for Provo Fire and Rescue

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of others.

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Abstract

The problem identified the Provo Fire and Rescue has not identified the target hazards located within their response area. The Purpose was to establish a process to identify target hazards and present them in a usable format for Provo Fire & Rescue personnel. Action research was utilized to identify the best way to identify target hazards. This research will answer the following questions: a) why do we need target hazard identification? b) What is the definition of a target hazard? c) What criteria should be used to identify target hazards?

A literature review and questionnaire were used to help answer the research questions. The questionnaire was given to Provo Fire and Rescue command staff. The results of the research identified the importance of knowing the target hazards in the community, and that there is not a standard definition of a target hazard. Each public safety entity is responsibility to form their own definition based on the community and their response capabilities. A target hazard criterion is also based on the area and response capabilities. Recommendations for this research included the creation of a target hazard identification form, which will give each target hazard a risk score. This quantification will allow for the formation of a priority list for future pre-planning. It was also recommended to establish a committee to look at and establish a pre-plan program.

Table of Contents

Introduction

It is nearly impossible to predict when or where a disaster is going to strike in the United States. According to the United States Fire Administration (2009), the best way to reduce loss of life and damage from such events is through understanding the hazards in the community, how they may affect the community, and then planning for them. Understanding the hazards can be viewed as a vital part of emergency planning. Because of events such as 9-11 and Katrina, There has been a heavy emphasis put on emergency planning, which has become an important aspect of the everyday workings of emergency services.

When there is proper planning for hazards in the community, it gives the local fire department the tools necessary to help mitigate situations should an emergency arise. A problem arises when the local fire service does not understand the risks they may face in the event of a natural or manmade disaster. Trulson (2007) agrees stating because his city of Joplin has not completed a risk assessment of the community, emergency response will be difficult. He continues to explain hazard assessments help local fire service to understand their needed resources and response capabilities (p.6).

The city of Provo is not unlike any other city in the United States, in that they have had their share of natural, accidental, and deliberate disasters. The problem is Provo Fire & Rescue has not identified the target hazards located within their response area. The purpose of this research is to establish a process to identify target hazards and present them in a usable format for Provo Fire & Rescue personnel. Using the action method of research, the research questions are: a) Why do we need target hazard identification? b) What is the definition of a target hazard? c) What criteria should be used to identify target hazards?

Background and Significance

In order to understand if there is a need for a target hazard program, it is important to understand the demographic of Provo City and Provo Fire and Rescue. Provo City covers 43 square miles and has a population of 125,000. Within the boundary of the city sits a major university with a student population of nearly 40,000. Over the last twenty years Provo has seen a large jump in population form 95,000. Provo city has a mixture of commercial, residential, and industrial properties. Passing through the city is a major interstate, two railroads, river, and a small airport. In the past five years, it has been difficult for developers to find new ground to build on, so they have begun to build skyward.

In the downtown area alone, four new high rise complexes have been built in the last five years. All of these replaced smaller one and two story structures. The new structures have retail properties on the first and second floors, and the remaining floors are apartments. With the down turn in the economy over the past ten years, Provo City has been heavily recruiting new businesses. The recruiting seems to be paying off as there is a lot of retail construction in progress now. Most of these businesses plan on being open within the next two years.

Provo Fire and Rescue is a fulltime department with 71 full time firefighters. Service is provided to the city out of five fire stations strategically located throughout the city. There is a sixth station at the airport, but it is only staffed when large aircraft come in or out of the city. Minimum staffing for the department is 19 personnel including the on duty Battalion Chief. In addition to fire, emergency medical services are provided to the city. Provo Fire and Rescue run their own ambulances to provide transport. Last year Provo Fire and Rescue responded to slightly over 10,000 calls for service, with 85 percent being medical and the remaining being fire, hazmat, or special rescues.

The fire prevention office of Provo Fire and Rescue has been staffed with one or two personnel for as long as this researcher has been with the department. The second person has recently become permanent in the last five years. Last year, they added a third person to the office. It would be ideal for the fire prevention office to take on the initial task of target hazard identification, but with only three personnel to keep up with new construction and public education, they are too busy.

Over the last fifteen years, Provo Fire and Rescue has not had an increase in manpower. In addition, the department just lost three firefighters due to a decrease in the budget. Provo Fire and Rescue share borders with two other cities. Springville is a much smaller city with a combination part-time/volunteer department. They provide serviced to their city out of one fire station. Orem City is very similar in size to Provo City. Their fire department is also very similar in size, providing service out of five stations. Provo Fire and Rescue have mutual aide agreements with both cities. However, they are not always available due to handling the calls for service in their own city.

With a city the size of Provo, there are bound to be many target hazards. However, Provo Fire and Rescue has never identified these target hazards. They have performed some preplans, but they sit in a filing cabinet and are not readily available to the crews. They do perform annual business inspections, but those inspections do not contain a means of hazard identification. They are done as part of the business license. They can be view as a service for the city, and not necessarily as a benefit to the department or its members. The paperwork of an inspection is never seen again after being turned in as proof of the inspection being complete.

Provo Fire and Rescue has come to realize the importance of providing hazard information to the personnel for emergency response. This applied research paper (ARP) relates to the National Fire Academies Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM). The course work of EAFSOEM provides knowledge for the student to be able to perform vulnerability and capability assessment for target hazard infrastructure sites. This research compliments the operational objective of the United States Fire Administration (USFA) goal number two, to improve local planning and preparedness (USFA, 2009).

Literature Review

Why do we need target hazard identification?

Given the size and scope of natural and manmade disasters in the recent past, the Federal Emergency Management Agency (FEMA) has become the lead agency in educating communities on the importance of planning for an emergency situation. FEMA (2010) publishes an emergency management guide; within this guide is a four step process for planning. The second step specifies for a department to analyze its capabilities and hazards. The tool they provide does not give specifics on how to identify actual hazards, which is a concern. It merely outlines vulnerabilities by emergency type.

When responding to emergencies, a fire department generally only has the information given to them by the dispatch center. This lack of information puts them at a disadvantage to mitigate the situation. When considering the life safety and property loss issues in most emergencies, the more information the responders have the more likely they are to stop the loss of life and save the property. As we are educated in the fire service we learn about fire behavior,

the properties of water, building construction, and many other factors that may affect how we handle an emergency situation. It is assumed this knowledge will be used to make educated decisions on the emergency scene. However, it is nearly impossible to make an educated decision without the particulars of the hazard. This knowledge can be gained through a pre-fire plan. A pre-fire plan provides additional needed information to make educated decisions about how to mitigate the situation. Godschalk (2003) agrees by stating a well-designed pre-fire plan can help reduce the cost of disasters within a community.

Coleman (2004) asserts fire service leaders make decisions that affect the overall outcome of an incident in a split second. Having prior knowledge of a target hazard may help them make the necessary decisions. However, just knowing a business is there is not enough. Coleman posits:

"We in the fire service face hundreds, if not thousands, of decisions every year. Some must be made at the time of a crisis, such as those an incident commander makes on the fire ground. But most decisions are made under far less stressful conditions. They have to do with budget issues, personnel matters and program management, to name a few. Many of these decisions have gar greater consequences than those that occur on the fire ground. An interesting aspect of these decisions is that fire service managers often don't have a chance to revisit them. Most decisions are based on previous ones, with the net result being that organizations tend to evolve over time without re-evaluation of the basic reasons why they could or should be doing things" (p.34).

Gassaway (2010) contends situational awareness is the best way to ensure an incident is dealt with appropriately. He describes situational awareness as the ability to understand events

as they happen and predict the consequences of those events. In order to predict where the consequences of the events are, an incident commander needs to have information to make those predictions. The information of the target hazard is contained and presented in the form of a pre-fire plan.

The need to have a pre-fire plan cannot be understated in the fire service. According to the International City Management Association (ICMA) the first step in developing pre-fire plans is to establish a list of target hazards. This will then give the department a path to develop the ever important pre-fire plan. Pre-fire plans come in to play when a city receives their Insurance Service Office (ISO) rating. ISO evaluates departments every ten years and issues them a Public Protection Classification (PPC) rating from 1-10. This rating is then used to establish insurance premiums in the community. A rating of 1 is the highest, indicating a department meets all ISO standards. In order to receive the pre-fire plan credit, a department must perform pre-fire plans twice a year on all commercial, industrial, and institutional structures (Galvin, 2007). These types of structures should be identified as target hazards.

With the current economic downturn, fire departments have to stretch their budgetary dollars further than ever. It is important to have the necessary tools to accomplish the tactics of an emergency scene. This means departments are being forced to purchase on the essential tools. Understanding the hazard a department will have to deal with is a vital part of understand what resources are necessary according to Jenaway (2008). Knowing the hazards gives a department a way to prioritize the spending of budget dollars on vital resources.

What is the definition of a target hazard?

An extensive literature review resulted in finding many differing views of the definition of a target hazard. A search of literature outside emergency services found no other industries using terminology of target hazard. This does not indicate other industries do not identify potential hazards they may face, it just indicates target hazard is terminology specific to emergency services.

ICMA (2009) defines a target hazard as "large structure with multiple floors or properties that pose significant hazards and represents a potentially large loss of life or property" (n.p.). When a hazard is identified, it means it will have a significant impact on the community and will overwhelm the resources of the local emergency response agencies according to the United States Department of Homeland Security (2009, pp.4-9).

The National Fire Protection Agency (NFPA) describes target hazards as "a condition, situation, or action that creates or increases expected loss frequency, or severity" (as cited in United States Department of homeland Security, 2009, p.6). Many times target hazards are viewed as large structures that have the potential for large loss of life or property. However, Bachman (2004) argues a target hazard can be any hazard that overwhelms resources, exposes limitations, and exploits a department's deficiencies. Reeder (2008) contends target hazards are "locally defined occupancies that pose specific risks to occupants and the fire service responders" (para. 1). Reeder continues by stating we all know a high rise with thousands of people in it are target hazards, but the care facility with twenty non ambulatory patients may also be a target hazard. This is true because according to his definition there is a risk to the occupants and the responders if they do not have enough personnel to handle the evacuation and still perform fire attack. It is difficult to pin down one definition of a target hazard. Even the experts tend to disagree on an exact definition.

Sometimes it is useful to go back to the basics to understand how and why we do things in the fire service. The basics are taught when new firefighters enter the fire service. In this case the International Fire Service Training association (IFSTA) publishes a text book for firefighters to learn the basics from. They list the definition of a target hazard as "A target hazard is viewed as a facility in which there is a great potential likelihood of life or property loss from fire" (2008, p.659). While this definition is a little narrow in that it only talks about fire, it may be the foundation definition the others were based on.

Most of the definitions contain verbiage pertaining to loss of life, or property and are based on a local fire departments ability to respond. This is evident by the statements indicating resources being overwhelmed. The reality seems to be each department needs to decide on which definition to use based on the amount of man power and the availability of resources.

Hart (2001) discusses the difficulties departments have in target hazard identification. He posits the locations where large economic, political and physical loss would be great if an event were to happen, needs to be considered. Hart also contends each department needs to decide what criteria they are going to use to identify a target hazard, and then begin to identify them. This methodology will help ensure no target hazard sites go unrecognized.

What criteria should be used to identify target hazards?

The NFPA standard 1620 for pre-incident planning is the standard most fire departments use as a minimum standard for pre-incident planning. The standard also provides a summary of considerations for the purpose of selecting target hazards. The considerations are based on the protection of occupants, responding personnel, property and the environment. Also provided in Annex C, titled Special or unique characteristics of occupancy classifications, contains

recommendations of how departments can use the features of target hazards to create pre-plans (NFPA, 2009).

Heldon and Stewart (2008) believe departments should identify critical facilities, lifelines, and resources in the community, which are essential to everyday life of the community, as a means to target hazard identification. They provided a list of examples for possible categorization of target hazards: fire, police, communication, transportation, utilities, government, hospitals, shelters, nursing homes, and evacuation routes. This should not be considered an all-inclusive list, but rather a start. Each community will have their own unique list based on the target hazards found in the community.

NFPA 1710 (2010), the standard for the organization and deployment of fire suppression operations asserts lists buildings with high hazard occupancies be considered target hazards, even if there is not a large risk of life loss. These occupancies include buildings with hazardous materials, and special medical needs. This can be found in annex A, explanatory material. This standard uses the definition of "the potential for harm of damage to the people, property, or environment" (para. 3.3.13) for target hazard identification. The problem with this definition is that almost all occupancies affected by an emergency or disaster can be fit into this definition.

Hart (2001) believes it is a fire departments responsibility to aggressively identify target hazards within their jurisdictions. He provides a list of occupancy that need to be divided into categories for prioritization:

1. Schools
2. High-rise buildings
3. Public assembly occupancies

4. Stadiums, reviewing stands, and amusement parks
5. Apartment buildings, hotels, and motels
6. Hospitals, sanitariums, and nursing homes
7. Shopping malls
8. Hazardous occupancies
9. City, county, and state buildings

Smoke (2009) agrees with this list, but adds several other occupancies to the list to be considered:

1. Jails and prisons
2. Occupancies that present difficult challenges
3. Occupancies with high property value
4. Large mercantile and business occupancies
5. Large unoccupied buildings
6. Buildings under construction or demolition

The United States Fire Academy's (2011) student manual for Executive analysis of community risk reduction outlines a means for selection and identification of target hazards by company officers. It uses four criteria for evaluation frequency, severity, duration, and response capabilities. Using these four criteria can be of value when considering how to determine target hazards in a given response district.

Procedures

The primary means of answering the research questions was an extensive literature review. The literature review start in the fall of 2012 at the National Fire Academy's learning

resource center in Emittsburg, Maryland, and Upper Iowa's online library. Every effort was made to ensure current literature was used. The search included target hazards, pre-planning, and risk assessments.

A survey was used as means of gathering information for original research the survey can be found in Appendix A. The survey was given via personal interview during the week of February 4th 2013. Interviews were held with Provo Fire and Rescue's command staff (Battalion chief and above), two members of the fire marshal's office, and the Provo city emergency coordinator. There were seven total interviews held, equaling 88 percent of the eligible personnel interviewed. The only person not participating was the fire marshal, but both the deputy fire marshals participated. The survey was used to answer all research questions.

The interviews were given one at a time. Initial instructions were given along with an explanation of the research project. The questions were then read to the respondent, thus allowing them to ask clarification questions if needed. No respondents needed clarification of the questions presented to them. Although they were given in oral interview form the respondents were asked to write their responses. The following questions were asked:

1. How would you define a target hazard?
2. What criteria would you use to identify target hazards within our Provo City?
3. What information is important to obtain about target hazards within Provo City?
4. Should target hazard identification be a priority for Provo Fire and Rescue?
5. Who should be responsible to identify target hazards in Provo City?

The limitation of the research includes the minimal amount of literature outside the fire service pertaining to target hazard identification and prioritization. The limited number of

respondents can also be viewed as a limitation of the research. The survey was kept to Provo Fire and Rescue members due to the amount of literature claiming target hazard identification is department specific. There is also a possibility that a bias may have been created during the instructions of the survey, as our local hospital was used as an example of a target hazard due to the large number of persons and the onsite hazardous materials. The respondents were asked not to discuss the survey with other members of the command staff, as they were not all able to take the survey the same day.

Results

Research question one: Why do we need target hazard identification?

The literature reveals that the knowledge gained from target hazard identification can help first responders take control of the emergency scene and decrease the amount of life and property loss. Coleman (2004), Godschalk (2003) and Gassaway (2010) all agree that prior knowledge of a hazard can have a profound effect on the outcome. Target hazard identification can also have cost saving benefits to a municipality. It is part of the rating scale for ISO rating, and according to Jenaway (2008) is a way to help identify the key resources needed, thus helping departments in the budgetary process.

It is a recommended practice by FEMA (2010), NFPA standard 1620, and the Department of Homeland Security (2009). All the respondents to the survey asserted they believe target hazard identification should be a priority for Provo Fire and Rescue. While none of these agencies have the ability to mandate target hazard identification, they can at any time make it a requirement to receiving grant moneys. NFPA standard are seen as best practice and most departments try to comply.

Finally, the fire service has long asserted that life safety is the first priority at any emergency scene. Firefighter's lives are considered part of that priority. Identify the hazards and educating them of those hazards, may save the life of a firefighter one day. Gassaway (2010) called this situational awareness, and Jenaway (2008) asserts this knowledge is one of the tools necessary to perform the job.

Research question two: What is the definition of a target hazard?

Neither the literature review, nor the survey resulted in a common definition of a target hazard. The definition that seems to encompass all of the others is asserted by Reeder (2008) "locally defined occupancies that pose specific risks to occupants and the fire service" (para. 1). The only thing it seems to lack is acknowledgement of the dangers posed to citizens. Many of the other definition focused on a specific type of structure.

ICMA (2009), IFSTA (2008) contend a target hazard should be tied to a structure. All of the survey respondents mentioned either a building, occupancy, or structure. Only one, or 14 percent, mentioned a demographic area. Four of the seven, 58 percent, mentioned life loss or occupancy load as part of their definition. Another consideration expressed by Bachman (2004) and one or 14 percent of the respondents, is the possibility of overwhelming the resources of the responding department. Three of the respondents, 43 percent, assert a building with *high hazard* be considered part of their definition. The issue of *high hazard* is not defined by the respondents. This could be useful if all parties were in agreement of the definition of high hazard.

Research question Three: What criteria should be used to identify target hazards?

The literature review and the survey resulted in many different criteria to be included in the identification of a target hazard. The survey respondents talked about loss of life, occupancy type, and special hazards. Heldon and Stewart (2008), NFPA (2010), ICMA (2009), and IFSTA (2008) all assert life safety as one of the primary means of target hazard identification. Looking at the lists provided by Hart (2001) and Smoke (2009), the top of their lists were structures having large occupancies. It is easy to say they are positing life safety as a priority.

Interestingly, only four of seven respondents list life safety or high occupancy as criteria. This constitutes 57 percent of those survey believe life safety should be a part of the criteria. Yet, the fire service has long asserted life safety as the top priority in everything they do. Only 29 percent of the respondents list the size of occupancy as criteria. One of the respondents did reply by stating “a building or business that would cause a drain on city/fire resources” size may be a factor in resources being overwhelmed.

Jenaway (2008), and Heldon and Stewart (2008) believe the effect on the community or, economic effect should be considered, 57 percent of the survey respondents agree. This could mean critical resources of the community or businesses that produce a large amount of income in the form of taxes. Special hazards were mentioned by 71 percent of the respondents, and wa mentioned often in the literature review. Special hazards mentioned specifically were: hazardous materials, health safety risks, and potential unknowns have the potential to cause harm to the public or responding personnel. The survey results can be found in appendix B.

While conducting research, an established target hazard identification program was discovered. This program is being used by Sioux City Fire Rescue. Their program uses; life hazard, loss impact, hazard index, fire protection systems, building usage, building construction,

number of stories, and square footage to obtain a hazard risk score. This program not only identifies target hazards, it has the ability to quantify them via an assessment score. This is not a published document; it was obtained from a fellow EFO participant. During a conversation with Lieutenant Tom Standish of the Sioux City Fire Rescue on March 1, 2013, I mentioned what my research project was and he stated they had a program in place. He then emailed the document to me. The document can be seen in Appendix C.

Discussion

Brannigan and Cobertt (2009) well know experts in the fire service on building construction, posits it is imperative to know your enemy. He is referring to buildings and how they react when they are on fire. In our case, it is important to know the enemies or target hazards in the city. The United States military also subscribes to this theory. When making tactical decisions, it is important to know the capacities of the enemy. Again, this applies to emergency response. If the personnel know what they are responding to and how it may react in an emergency situation, they can make a more educated decision in regards to mitigation. It also gives them an upper hand on knowing the resources needed to stabilize the situation.

Knowledge is a powerful tool and may be underrated in the fire service. Firefighters learn about; building construction, fire behavior, properties of water, and are constantly practicing for the worst case scenario. Target hazards represent the worst case scenario, Gassaway (2010) agrees, he asserts we need to know the total potential of a hazard to help reduce the amount of carnage should a hazard happen. Galvin (2007) and Jenaway (2008) present evidence that knowledge of target hazards can help reduce the damage. The only way to gain such knowledge is through target hazard identification.

It could also be argued local emergency services have a responsibility it to the community to understand target hazards in their response area. This helps reduce costs, through resource purchasing as pointed out by Jenaway (2008) and Godschalk (2003). The businesses within a community can also benefit from the identification of target hazards due to the effect on the ISO rating. Finally, it is a recommendation of FEMA (2010) for all communities to understand the hazards within their borders. While there is not a direct legal obligation to identify target hazards there is most certainly enough information to say it is in the best interest of the community, city administration, fire department, and firefighters that serve the community.

In an attempt to identify the definition of a target hazard, it was found that no standard definition exists. This could be frustrating to local emergency services attempting to start a target hazard identification program. However, this researcher sees it as an opportunity to look at the department resources and response capability. This introspective look will provide the needed information to form a definition of a target hazard. Establishing a target hazard definition in this fashion aligns with the definition asserted by Bachman (2004), Reeder (2008), and the United States Department of Homeland Security (2009).

Because there is no one single accepted definition of a target hazard, departments either need to pick one of the definitions asserted by a fire service manual, an expert in the field, or a government agency. Contemplating the difficulties in target hazard definition identification Hart (2001) states when a department looks at their resources and response capabilities to come up with a definition, they are much less likely to miss a target hazard in the community. Imagine the tragedy of adopting someone's definition only to find out in an emergency situation there were target hazards not identified.

The question of what criteria should be used to identify target hazards is as controversial as pinning down a universal definition. However, there are some commonalities that can be found in both the literature and the questionnaire. The commonly seen criteria are of life safety. Although it may be written as life safety, it is easy to infer that is the underlying issue. NFPA 1620, Heldon and Stewart (2008), Hart (2001), Smoke (2009), and more than half of the respondents to the questionnaire list life safety as a needed criterion. Other criteria include special hazards such as hazardous material or specialty storage. Heldon and Stewart (2008) assert the need two look at the functionality of the occupancy to the community when determining target hazards. Hart (2001) appears to be in agreement with his list of target hazards; city, county, and state buildings.

The ability to overwhelm local emergency services is another commonly listed criterion for target hazard identification. Understanding a disaster in an occupation will exhaust local resources allows for contingency planning. This theory is taught in detail at the United states Fire Academy. Students spend two weeks in class learning the value of target hazard identification for the purpose of disaster planning. They also provide criteria for identification; among the list is a response capability of local emergency services (United States Fire Academy, 2009).

As stated previously, the purpose of this research was to establish a process to identify target hazards and present them in a usable format for Provo Fire & Rescue personnel. The form received from received from Sioux City Fire Rescue does a good job of using the criteria identified in the literature review and the questionnaire to give occupancies a risk number. The risk number can be used to identify the highest risk occupancies in the community, there for

establishing a list. However, the form is used by a department larger than Provo Fire and Rescue and therefore needed to be adjusted to become a workable document.

Based on past experience, the number of occupants in a structure is much too high. Smaller numbers would easily overwhelm the nineteen firefighter on duty each day. It was also felt that the number of stories below ground is just as important as the number of stories above ground. Finally, the form does not give any specifics about the building or occupancy. Having a risk number is very useful; it does not give fire crews the needed information in detail. Details such as building construction type, riser location, gas shut-off location, and special hazards. While these details are not necessarily needed to identify the target hazard, they are needed in the event of an emergency.

Recommendations

The purpose of this applied research project was to develop a process for Provo Fire and Rescue to identify target hazards. After performing an extensive literature review, and evaluating the questionnaires, it was discovered that having a process for target hazard identification is essential. Currently, Provo Fire and Rescue has not identified the target hazards within their response area. Furthermore, because target hazards have not been identified there is no pre-plan program in place. Provo Fire and Rescue do perform annual business inspection on the nearly 2,500 businesses in the city. An easy to use document that can be filled out during the business inspection may renew interest in target hazard identification and stress the importance of target hazard identification to the member of the department.

The first recommendation based on the applied research performed is for Provo Fire and Rescue administration to adopt the new target hazard identification form that was built by using

Sioux City Fire Rescue's form (Appendix D). A second page was added to the form to gather usable information about the occupancy, thus making it more usable for Provo's firefighters.

The second recommendation is to have a department wide training explaining the importance of target hazard identification and how to use the new form. The training will allow the firefighters to ask questions, which will also allow them to have an understanding of the form and why we are using it prior to performing an evaluation. It may also help them answer any questions they receive from the building owners. Educating the public, especially business owners, will be an important part of the process.

The final recommendation is to put a group together to find a pre-plan program. Identifying target hazards within the city is the first step of many to improve the quality of service provided by Provo Fire and Rescue. After the target hazards are identified, they will be quantified by the risk number. This number will help Provo Fire and Rescue establish a priority list for occupancies to be pre-planned. With technological advances, there is no point in keeping this information on paper. It will be much easier accessed via an electronic pre-plan program.

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Appendix A

Target hazard interview sheet

How would you define target hazards?

What criteria would you use to identify target hazards within Provo City?

What information is important to obtain about target hazards within our city?

Should target hazard identification be a priority for Provo Fire & Rescue?

Who should be responsible to identify the target hazards within Provo City?

Appendix B

Interview answers

How would you define target hazards?

1. High hazard occupancies or businesses.
2. A structure or demographic area presenting the potential to injure, kill or create great financial loss due to an emergency event.
3. A facility that creates a special hazard either to human life, economic impact, potential to do harm.
4. A single identified hazard- “target hazard” does not make sense to me. To me a hazard is wildfire, chemical spill, earthquake, and microburst.
5. Any building, business or area that because of its occupancy type, occupancy load, size or any special hazards that would be or cause the resources of Provo fire to be maxed out. Also, anything that causes or places a FF in great risk during the fighting of a fire.
6. A building that has large life hazard, safety, hazard, or large economic impact.
7. Building or area that I was concerned about: fire load, occupancy load, items stored (gas, flammable liquids, hazardous materials).

What criteria would you use to identify target hazards within Provo City?

1. A building or business that would cause a drain on city/fire resources. Has potential to create harm to the community.
2. Contents/storage types, number of residence or workers, relationship to other exposures, footprint, height, and accessibility of firefighting needs (i.e. hydrants, access, and ectc.).
3. Life Safety, life safety with special circumstances, and economic impact.

4. Determine the level of impact to the facility, and community from hazards present in the jurisdiction, business, building's, or population.
5. Occupancy type, occupancy load, health and safety risks, special hazards involved, are there fire protection systems in place, type of construction, size of building, where occupants are not capable of self-preservation.
6. I base it on the # of occupants and the mobility of the occupants. Also, factor in chemicals and safety hazards to the city and firefighters. I would also consider the economic impact of losing the business.
7. Inspections, common knowledge.

What information is important to obtain about target hazards within Provo City?

1. Type of business, use, fire protection system, water supply, and occupancy.
2. When occupied by greatest numbers, storage, special hazards, structure type & class, suppression and alarm system info., responsible party info., exposures, firefighter access, and building diagram, exterior and interior, building/area specific peculiarities.
3. Occupant load, egress, evacuation plans, emergency contacts, facility layout, location of shutoffs, and special hazards.
4. Population that could be affected by: residents, employees, surrounding homes, patient within. Cost/impact in the community: loss of services, evacuation needs, haz-mat present.
5. Same as above with responsible person's information, water supply.
6. Number of occupants, location of FDC, exits, hydrants, location of chemicals or other hazards, fire alarm panel, Knox box location, and access problems.

7. Building type or construction, yes or no on fire protection systems, occupancy load, items stored.

Should target hazard identification be a priority for Provo Fire and Rescue?

1. Yes.
2. I believe it should be listed as one of our higher priorities.
3. Yes.
4. Yes, but it does not stop there, they should be included in an annex or response plan, updated annually, stored in an accessible database.
5. It is always of great benefit to FF's when they have the information that could help them or prevent loss of life before the fire or incident occurs. It is also important to have that information readily available.
6. Yes, as long as we get a system to use the info. Pre-fire plans should go along with target hazard identification.
7. Yes.

Who should be responsible to identify the target hazards in Provo City?

1. Fire crews or area stations.
2. I believe target hazard identification should start with the plan review in fire prevention and continue to annual inspection data collected by fire crews. Ultimately, identification and classing should be the responsibility of fire prevention.
3. Individual stations, crews who know the area working with fire prevention division.
4. This should be a collaborative effort with public safety managing the analysis.

5. The crews- this information is for their use. Doing the report and seeing the building up close and personal is of great worth.
6. Primarily it would be best if a source such as fire prevention would identify and coordinate pre-fire plans. It is also every captains and crews responsibility to know the target hazard in their district.
7. Fire marshal's office- with the crew's help they have to have buy in or it will not work, then we need to support their efforts with proper technology for storing and utilizing the information obtained. This includes a way for the from line personnel to use this info on a scone and a way for dispatch to be in the loop.

Appendix C

Life Hazard – Consider the number of occupants and their ability to self-evacuate.

High (Greater than or equal to 100 occupants) 3
Medium (Between 10 – 99 occupants) 2
Low (Less than 10 occupants) 1

Loss Impact – Indicate the non-monetary value that best represents the value of this property to the community.
Major Loss to Community - Infrastructure, Cultural, Historical 3
Moderate Economic Impact, Sever Casualty Exposure 2
Small business, personal and/or family loss 1

Hazard Index
Hazardous to firefighting activities (i.e. chemical plant) 3
Mixed hazards (i.e. business warehouse) 2
Limited hazards (i.e. single-family house) 1

Fire Protection Systems
No sprinkler system 3
Partially sprinklered 2
Fully sprinklered with fire pump 1

Building Usage
Industrial 3
Residential 2
Business / Offices 1

Building Construction
Combustible 3
Limited combustible 2
Non-combustible 1

Number of stories above grade
Three stories or more 3
Two stories 2
One story 1

Square Footage (length x width x number of stories above grade)
Greater than or equal to 15,000 square feet 3
Between 7,501 – 14,999 square feet 2
Less than or equal to 7,500 square feet 1

Total Score ☐

TARGET HAZARD IDENTIFICATION

Low Risk: ≤ 14 Medium Risk: 15 – 19 High Risk: ≥ 20

Instructions

1. This form should be completed by each individual company while completing the annual fire inspection for the occupancy.

2. Enter the occupancy's address, inspection file number, and the date the inspection took place. This form only needs to be completed during the initial inspection, and does not need to be duplicated for call-back or follow-up inspections.

3. Circle the appropriate score for each category using the following as a guideline:

    a. Life Hazard
    Consider the number of occupants in the structure during peak times and their ability to self-evacuate in the event of an emergency. For example, a college dormitory at night during the school year would have a higher life hazard than an office building during the same hour of day.

    b. Loss Impact
    Indicate the *non-monetary* value that best represents the value of the property to the community. For example, the loss of a major transportation center disrupts the mass transit capabilities of the community and would be considered a severe loss. On the contrary, the loss of an ordinary business or single family home may only affect the occupant or owner. This is a subjective category, so use your best judgment.

    c. Hazard Index
    This refers to the overall degree of difficulty in extinguishing any fire that may be present at the facility and the level of safety risk to firefighters. This again relies on the judgment of the fire officer and crew.

    d. Fire Protection Systems
    Determine if the structure is equipped with an operable sprinkler system, and the portion of the building in which it protects.

    e. Building Usage
    Is the building used primarily for industrial activities, residential, or general business / office space. For mixed facilities, choose the higher of the two. For example, if a facility has office space mixed with residential, assign a score of 2 rather than 1.

    f. Building Construction
    Determine the predominate type of construction. Again, for structures that span across multiple construction types, choose the higher score.

    g. Number of Stories Above Grade

Calculate the number of floors above grade. For the purpose of this analysis, grade is determined as the lowest ground-level entryway to the structure.

h. Square Footage
Calculate the square footage of the building by multiplying the width x height x number of stories.

Add all scores together to achieve the total risk hazard score. Enter this score on the Fire Prevention Bureau inspection form next to "RA". Submit the inspection form with the Risk Analysis Form to the FPB.

Appendix D

Life Hazard – Consider the number of occupants and their ability to self-evacuate.

High (Greater than or equal to 50 occupants) 3
Medium (Between 10 – 49 occupants) 2
Low (Less than 10 occupants) 1

Loss Impact – Indicate the non-monetary value that best represents the value of this property to the community.

Major Loss to Community - Infrastructure, Cultural, Historical 3
Moderate Economic Impact, Severe Casualty Exposure, Small Business 2
Personal and/or family loss 1

Hazard Index

Hazardous to firefighting activities (i.e. chemical plant) 3
Mixed hazards (i.e. business warehouse) 2
Limited hazards (i.e. single-family house) 1

Fire Protection Systems

No sprinkler system 3
Partially sprinklered 2
Fully sprinklered with fire pump 1

Building Usage

Industrial 3
Residential 2
Business / Offices 1

Building Construction

Combustible 3
Limited combustible 2
Non-combustible 1

Number of stories above/below grade

Three stories or more 3
Two stories 2
One story 1

Square Footage (length x width x number of stories above grade)

Greater than or equal to 15,000 square feet 3
Between 7,501 – 14,999 square feet 2
Less than or equal to 7,500 square feet 1

Total Score ☐

Low Risk: ≤ 14 Medium Risk: 15 – 19 High Risk: ≥ 20

TARGET HAZARD IDENTIFICATION

PROVO FIRE & RESCUE

Bldg Address: _____ Bldg Name: _____ Inspection District: _____

Responisible Party: _____ Phone: _____

BUILDING CONSTRUCTION

☐ Type I: Fire Resistive ☐ Type II: Non Combustible ☐ Type III: Ordinary
☐ Type IV: Heavy Timber ☐ Type V: Wood Frame

Exterior: ☐ Brick ☐ Stucco ☐ Metal ☐ Wood

Roof: ☐ Pitched ☐ Arched ☐ Flat ☐ Concrete ☐ Shingles
☐ Tar & Gravel ☐ Tile ☐ Membrane ☐ Metal

Roof: ☐ Steel Truss ☐ Bow String ☐ Wood Joist

_____ _____ _____

FIRE PROTECTION FEATURES

Sprinkler System: ☐ Yes ☐ No
Riser Location: _____ FDC Location: _____
Fire Dept Access: ☐ Yes ☐ No Fire Alarm System: ☐ Yes ☐ No
Smoke Detectors: ☐ Heat Detectors: ☐ Beam Detectors: ☐
Fire Alarm Control Panel Location: _____ Annuciator Location: _____
Smoke Management System: ☐ Yes ☐ No Hood: ☐ Yes ☐ No
Fire Control Areas: ☐ Yes ☐ No Stand Pipe: ☐ Yes ☐ No Location: _____

FIRE OPERATIONS

Hydrant Locations: _____
Knox Box ☐ Yes ☐ No Location: _____
Bldg Length: _____ Bldg Width: _____ Bldg Height: _____

_____
Gas Shut-off Location: _____ Electric Shut-off Location: _____
Roof Access: ☐ Yes ☐ No Location: _____
Exposures: _____

SPECIAL HAZARDS

_____
_____
_____
_____

BUSINESS NAMES
